DOCUMENT RESUME

ED 176 238 CS 005 013

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TITLE Differential Utilization of Syntactic and Semantic Information by Skilled and Less Skilled Readers in the Intermediate Grades.
PUB DATE Apr 79
NOTE 19p.; Paper presented at the Annual Meeting of the American Educational Research Association (San Francisco, California, April 8-12, 1979)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Beginning Reading; Cloze Procedure; Context Clues; Elementary Education; Reading Comprehension; Reading Improvement; Reading Instruction; *Reading Processes; *Reading Research; *Reading Skills; *Semantics; *Structural Analysis; *Syntax

ABSTRACT

To assess the extent to which syntactic and semantic information guides the reading performance of skilled and less-skilled readers in the intermediate grades, a study was conducted involving 96 fourth, fifth, and sixth grade students. The students were matched both within and across grade level on nonverbal IQ and within each grade level on age. The skilled and less-skilled reading groups were also matched on reading achievement across grade. Each student's oral reading was individually tested on two types of task: the cloze procedure and transformed text. The extent to which the syntactic and semantic constraints of the text guided their performance was then assessed. Both on the cloze procedure and the transformed texts, skilled readers made greater use of grammatical and contextual information than did less-skilled readers. In addition, there was minimal improvement across grade levels in the proportions of syntactically and semantically appropriate responses. The stability of differences between skilled and less-skilled readers suggested the possibility that differential utilization of syntactic and semantic cues by beginning readers might contribute to differences among them in the development of reading skill. (Author/FL)

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Differential Utilization of Syntactic and Semantic Information by Skilled and Less Skilled Readers in the Intermediate Grades

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Paper Session 9.09
American Educational Research Association
San Francisco, 1979

CS005013

Abstract

Given the importance of contextual cues in the word recognition of mature readers, good readers in the intermediate grades might be predicted to employ a strategy of anticipation utilizing language structure and passage meaning more often than poor readers. The published evidence regarding such good-poor reader differences is equivocal, and variations in these differences across grade have not been examined.

Matched pairs of skilled and less skilled readers from the fourth-, fifth-, and sixth grades read aloud a variety of material in cloze procedure format and printed in geometric transformations. The extent to which the syntactic and semantic constraints of the text guided their performance was assessed.

Both on the cloze procedure and the transformed texts, skilled readers made greater use of grammatical and contextual information than less skilled readers. Furthermore, there was minimal improvement across grade levels in the proportions of syntactically and semantically appropriate responses.

The stability of differences between skilled and less skilled readers suggests the possibility that differential utilization of syntactic and semantic cues by beginning readers might contribute to differences among them in the development of reading skill. Further research should examine the persistence of individual differences from the early stages of reading acquisition.

Psycholinguists have theorized that the word recognition process in fluent reading is guided not only by the graphemic information on the page but also by the syntactic and semantic constraints imposed by the text. The important role of grammatical and contextual constraints in the word recognition of adult subjects has been demonstrated with a variety of procedures including the eye-voice span, eye-movement recordings, the cloze procedure, and tachistoscopic word recognition, among others. Particularly compelling is the evidence reported by Kolers (1970) that adults, in reading aloud geometrically transformed text (that is, text printed in mirror image, rotated, inverted, etc.) make word substitutions which are usually both syntactically acceptable and semantically appropriate. It has also been argued by psycholinguists, most notably Frank Smith and Kenneth Goodman, that the child who is just learning to read makes considerable use of grammatical and contextual information in decoding words. The evidence from research involving young children is sparse, but Rose Marie Weber (1970a, 1970b) has clearly shown that the syntactic and semantic constraints of the text do influence the word substitution errors that first graders make in their oral reading.

Given the importance of semantic and syntactic cues in the word recognition process of mature readers, it would seem reasonable to speculate that differences among children in facility at utilizing grammatical and contextual information might well contribute to variations among children in the development of reading skill. Weber's conclusions from her research on first graders' oral reading errors have, however, apparently discouraged other researchers from pursuing this possibility. Weber compared the proportions of syntactically acceptable and semantically appropriate word substitutions made by the "high" and "low" reading groups in her samples, and interpreted her findings as evidence that there is no difference in the use of grammatical and contextual

information among children varying in reading ability. She concluded from her results that "from the very beginning the children...without effort... transferred their capacity for handling spoken language to the reading task." There was, however a difference between the "high" and "low" reading groups' performance the importance of which was not stressed in Weber's reporting of the data. The better readers corrected significantly more of their errors disrupting the grammatical structure of the sentence as a whole than did the poor readers, while both groups corrected approximately the same proportion of errors that conformed to the sentences' grammatical structure. Thus, only the better readers showed by their corrections that they were sensitive to the grammatical constraints of the entire sentence. Perhaps Weber's "no difference" conclusion was not entirely warranted.

Although there has been very little research on beginning readers' utilization of grammatical and contextual information, quite a number of studies involving older children have some relevance to the issue. In brief, there is evidence that children in the intermediate grades make considerable use of semantic and syntactic information in their reading, but it is not clear from the data whether a differential utilization of these sources of information could account for reading-skill differences among children. The data from some well-designed experiments suggest that there is no relation between level of reading skill and sensitivity to language structure and passage meaning. For example, Guthrie (1973) using a cloze procedure, Rode (1974/75) using the eye-voice span, and Siler (1973/74) employing a semantic and syntactic violations paradigm compared the extent to which children at different grade levels utilized semantic and syntactic information in their reading, and found that the older, more-skilled readers made no greater use of these sources of information than did the younger, less-skilled readers. In contrast to these

findings, Weaver (1978) using the cloze procedure, Levin and Turner (1968) employing the eye-voice span, and Isakson and Miller (1976) using a semantic and syntactic violations paradigm have reported results that appear to be in direct conflict with those just presented. These latter researchers have compared good and poor reader groups within a single grade level, and have concluded that skilled readers do utilize semantic and syntactic information to a significantly greater degree than less-skilled readers.

The contradictions in the findings from previous research may be a result of methodological inadequacies in some of the studies. For example, in some cases questionable procedures have been employed in selecting the reading ability groups. Also, the difficulty of the test materials has sometimes been confounded with level of reading ability, such that any differences in performance between good and poor readers might be attributable to the relatively greater difficulty of the task for the poor readers. Another serious concern is that some of the studies have reported good reader - poor reader differences based on frequencies rather than proportions of errors; a higher frequency of errors violating semantic and syntactic constraints may simply reflect the fact that poor readers make more reading errors. In order to determine whether differences between good and poor readers are qualitative as well as quantitative, it is important to compare the proportions of their responses that are based on utilization of syntactic and semantic information.

The purpose of the present investigation was to assess the extent to which syntactic and semantic information guides the reading performance of skilled and less-skilled readers in the intermediate grades. The research was designed to permit both within-grade and across-grade comparisons of skilled and less-skilled readers. Also, special care was taken to circumvent methodological shortcomings found in some of the previous research.

The subjects in this research were 96 boys selected from a sample of 290 who were prescreened on standardized measures of reading achievement and nonverbal intelligence. The selected subjects were carefully matched both within and across grade level on nonverbal IQ, and within each grade level on age. The skilled and less-skilled reading groups were also matched on reading achievement across grade. These matching data are shown in Table 1.

Each boy's oral reading was individually tested on two types of task, the cloze procedure and transformed text. The cloze procedure materials included: individual sentences each with one highly semantically and syntactically constrained word deleted and replaced with a blank, and two paragraphs with approximately every fifth word deleted and replaced with a blank of uniform length. The transformed texts included: one passage printed in mirror reflection and another rotated in the plane of the page.

Each cloze response was scored for syntactic acceptability and semantic appropriateness in terms of the sentence up to the blank (prior context), and the sentence to the end (total context). Our scoring criteria (shown in Table 2) were similar to those used by Weber, and were found to be highly reliable. The oral reading of the transformed texts was scored in terms of the error categories for the Gray Oral Reading Test, with the addition of a "nonword" classification. Also, the word substitution errors were analyzed for semantic and syntactic appropriateness in the same way as the cloze procedure responses.

Both the cloze procedure and transformed text data were analyzed with a Multivariate Analysis of Variance, with Grade (fourth, fifth, and sixth) and Reading Ability (skilled and less-skilled) as factors. On both tasks there was essentially no effect of grade; overall the fourth-, fifth-, and sixth-grade children utilized semantic and syntactic information to about the same degree. There were, however, clear and consistent differences between the

skilled and less-skilled readers within each grade level on almost every measure (see Tables 3 and 4). The skilled readers at all three grade levels made proportionately greater use of semantic and syntactic information than did the less-skilled readers. Even when only the prior context was considered, the skilled readers' responses were based on the syntactic and semantic constraints of the text to a significantly greater degree. Sample transcripts of a skilled and a less-skilled reader's performance on both tasks are provided in Tables 5 and 6. These transcripts give a sense of the qualitative differences we found in the performance of skilled and less-skilled readers.

Our study, which included both across-grade and within-grade comparisons of skilled and less-skilled readers, provided an essential piece in a puzzle of conflicting data. When we re-examined the previous literature with our own findings in mind, we discovered that earlier studies in which across-grade comparisons have been made have usually reported that there is no difference between older, skilled readers and younger, less-skilled readers in the utilization of grammatical and contextual information. In these across-grade comparisons, children at a higher grade level have constituted the skilled reader group and children at a lower grade, the less-skilled. On the other hand, studies in which within-grade comparisons have been made, have almost invariably reported that there were differences between skilled and less-skilled readers in the utilization of semantic and syntactic information.

The implications of these findings both for future research directions and for educational practice are far reaching. Clearly, Weber's conclusions were premature. The possibility that beginning readers vary in their capacity to utilize semantic and syntactic information should certainly be given further attention by researchers. The fact that there was no change between grades four and six in the extent to which skilled and less-skilled readers utilized

grammatical and contextual cues in their reading may indicate that children bring with them to the reading situation relatively stable differential sensitivities to linguistic information. If that is the case, then perhaps the instructional emphasis employed with children should take these differential sensitivities into account.

References

Guthrie, J. T. Reading comprehension and syntactic responses in good and poor readers. Journal of Educational Psychology, 1973, 65, 294-299.

Isakson, R. L. & Miller, J. W. Sensitivity to syntactic and semantic cues in good and poor readers. Journal of Educational Psychology, 1976, 68, 787-792.

Kolers, P. A. Three stages of reading. In H. Levin and J. P. Williams (Eds.), Basic studies on reading. New York: Harper and Row, 1970.

Levin, H., & Turner, A. Sentence structure and the eye-voice span. In final report Project No. 5-1213, Cornell University to U.S.O.E., 1968; summarized in E. J. Gibson and H. Levin, The psychology of reading, Cambridge, Mass.: The MIT Press, 1975.

Rode, S. S. Development of phrase and clause boundary reading in children. Reading Research Quarterly, 1974/75, 10(1), 124-142.

Siler, E. R. The effects of syntactic and semantic constraints on the oral reading performance of second and fourth graders. Reading Research Quarterly, 1973/74, 9(4), 583-602.

Weaver, P. A. Syntactic differences in good and poor readers. Paper presented at the Meeting of the American Educational Research Association, Toronto, 1978.

Weber, R. M. First-graders use of grammatical context in reading. In H. Levin and J. Williams (Eds.), Basic studies on reading. New York: Basic Books, 1970 (a).

Weber, R. M. A linguistic analysis of first-grade reading errors. Reading Research Quarterly, 1970, 6, 427-451 (b).

Table 1

Group Means and Standard Deviations on

Age, IQ, and Reading Scores

			Chronological Age (in months)	Mean IPAT IQ Score	Gates-MacGinitie Reading Comprehension
Grade Four	Skilled Readers	M	115.75	110.69	55.94
		SD	2.21	8.49	4.07
	Less Skilled Readers	M	117.25	111.44	42.63
		SD	4.77	8.68	3.52
Grade Five	Skilled Readers	M	126.94	111.44	60.19
		SD	4.09	10.12	7.94
	Less Skilled Readers	M	127.88	110.50	42.94
		SD	3.77	8.42	3.21
Grade Six	Skilled Readers	M	140.25	108.63	58.38
		SD	2.82	6.57	3.70
	Less Skilled Readers	M	141.81	109.44	43.75
		SD	6.43	7.47	3.55

Table 2

Examples of Scoring Categories

1. Example of a word which is both grammatically acceptable and relevant to the context.

funny
A mole is a queer-looking little animal.

2. Example of a word which is grammatically acceptable but irrelevant to the context.

mold
A mole is a queer-looking little animal.

3. Example of a word which is grammatically unacceptable but which is relevant to the context.

animals
A mole is a queer-looking little animal.

4. Example of a word which is neither grammatically acceptable nor relevant to the context.

lily
A mole is a queer-looking little animal.

Table 3

Mean Proportions of Oral Cloze Responses of Varying Degrees of Acceptability for Skilled and Less Skilled Readers

	With Total Context Considered				With Previous Context Only Considered			
	Skilled	Less Skilled	F	Significance	Skilled	Less Skilled	F	Significance
Proportion of Completely Acceptable Responses	.919	.816	36.61	$p < .001$	.960	.912	26.98	$p < .001$
Proportion of Grammatically Acceptable Responses	.959	.916	16.03	$p < .001$	.985	.973	4.36	$p < .05$
Proportion of Semantically Appropriate Responses	.974	.908	22.37	$p < .001$	.991	.963	13.63	$p < .001$

Table 4

Oral Reading Errors Made By Skilled and Less Skilled Readers on Transformed Texts

	Skilled	Less Skilled	F	Significance
Number of Uncorrected Errors	18.71	30.33	9.54	$p < .01$
Proportion of Errors Corrected	.131	.108	1.00	n.s.
Proportion of Nonword Substitutions[1]	.331	.447	6.46	$p < .05$
Proportion of Completely Acceptable Word Substitutions	.101	.033	7.63	$p < .01$
Proportion of Grammatically Acceptable Word Substitutions	.293	.198	4.77	$p < .05$
Proportion of Semantically Acceptable Word Substitutions	.222	.118	6.02	$p < .05$

[1] Note that this proportion and all subsequent proportions are based on uncorrected errors.

Table 5

Cloze Procedure

GOOD READER IQ - 100 AGE - 131 READING ABILITY - 64

One day Tom was riding home on his bike. He was not looking where he was going. He was looking at two boys playing ball. Bump bump! went his bike, down down went Tom. He nearly ran into a tree. He looked at his bike. It was all right. Then he looked at his leg. It wasn't all right. There was a big bruise on his leg and it hurt.

Tom went home. He showed his leg to his mother. Mother said " I will put something on the bump. Then it won't hurt." Soon Tom was out playing again.

POOR READER IQ - 105 AGE - 132 READING ABILITY - 45

One day Tom was feeling home on his bike. Someone was not looking for he was going. He was not at all at two boys playing ball. But bump! went his bike, he down went Tom. He said run into a tree. He found at his bike. It was covered right. Then he looked at long leg. It wasn't all big. There was a big flower on his leg and it hurt.

Tom went home. He showed his leg to his mother. Mother said "It will put something on the bump. Then it won't hurt." Soon Tom was out riding again.

Table 6

Transformed Text

GOOD READER IQ - 100 AGE - 131 READING ABILITY - 64

funny spots on his
A mole is a queer-looking little animal. It has almost no neck and very

bun busy home
tiny eyes and ears. It is hard for a mole to see or hear (anything) A mole's

sted spotted
body is about six inches long and its pink tail is about one inch long.

begger exam
A mole is an excellent digger. It (digs) tunnels in the ground to make its

burrow
underground home (and) to look for food. A mole eats insects, earthworms and mice.

POOR READER IQ - 105 AGE - 132 READING ABILITY - 45

tesle iffit gun eges smal on ugh fegily
A mole is a queer-looking little animal. It has almost no neck and very

tiny hisle anyta mold
tiny eyes and ears. It is hard for a mole to see or hear anything. A mole's

bobby stont lunge sub it bink tifle ston on
body is about six inches long and its pink tail is about one inch long.

seem biggely bigs gorb misk it
A mole is an excellent digger. It digs tunnels in the ground to make its

unbergern horm sub earpswors sub emicks
underground home and to look for food. A mole eats insects, earthworms and mice.

Acknowledgments

This research was supported in part by a Grant-in-Aid of Educational Research from the Ontario Ministry of Education and in part by the University of Waterloo Research Grant program.

The authors wish to express sincere gratitude to the principals, teachers and students at St. Aloysius, St. Ambrose, St. Francis (Cambridge), St. Michael (Cambridge), and St. Paul Separate Schools for their cooperation in this research. In addition a special thanks is extended to Mr. Peter Hicknell, Superintendent of the Waterloo County Separate School Board, for his help in locating the schools.

For their assistance in collecting and scoring the data, the authors are also deeply indebted to Carolyn Griffin, Margaret Mallory and Tina Shanahan.

Note: A longer, more detailed report of this research can be obtained from the second author.